

Thin films or coatings having a thickness of about 100 nanometers or larger are made of nanostructured particles which have a particle size less than 100 nm (i.e. 0.1 micron) by thermally spraying a solution of a liquid coating precursor feedstock onto a substrate to form the film or coating. By thermal spraying with different precursor feedstock solutions, coatings can be made with more than one layer. Also, by varying the composition of the precursor feedstock during spraying, a fine composition gradient coating can be formed which is made up of the same small nanoparticle size particles of less than 100 nm. Many combinations of materials can be co-deposited and by applying an external energy source either during the coating process or during post deposition, the resulting coating can be modified.